

to determine the sustained impact of the initial initiative; group 2 was compared to group 1 to determine the impact of re-education, which involved a presentation to ED providers and a posted algorithm and fact sheet.

Results. Results from all time periods are summarized in Table 1. Improvement in inappropriate tx was still noted 3 years after the intervention (28% vs 32%; p = NS). Re-education did not further improve inappropriate prescribing, with 28% of group 2 pts still receiving tx.

Table 1.

Outcome	2016 Study		Current Study	
	Pre	Post	Group 1	Group 2
Pts tx'd for ASB/ASP	37/37 (100%)	12/37 (32%)	14/50 (28%)	14/50 (28%)
Pts tx'd for ASP w/o ASB	25/25 (100%)	6/27 (22%)	10/46 (22%)	10/45 (22%)
Pts returning to ED w/in 30 days	3/37 (8%)	4/37 (11%)	4/50 (8%)	4/50 (8%)

Conclusion. The decrease in inappropriate use of ABX for ASP/ASB was still noted 3 years after implementation of a multi-faceted AS initiative. Re-education did not result in further improvement.

Disclosures. James Johnson, PharmD, FLGT (Shareholder) Vera Luther, MD, Nothing to disclose

52. Direct Communication Improves Response Time to Acceptance of Antimicrobial Stewardship Interventions

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Session: P-04. Antimicrobial Stewardship: Outcomes Assessment (clinical and economic)

Background. Hospital antimicrobial stewardship program (ASP) reviews broad-spectrum antibiotics and recommends interventions to optimise antimicrobial use. However, about 30% of interventions are not accepted. This project aims to improve the response rate and time for acceptance of ASP interventions by direct communication with providers (via call or text messaging) once an intervention was made.

Methods. Pre-direct communication (PC) phase lasted from 1st Jan - 31st Dec 2017. A typed intervention was placed into the patient's medical records for the team to review. Thereafter, a direct communication (DC) phase ran from 1st Jan 2018 - 31st Jan 2019. Teams were immediately notified of any ASP interventions made via a call or text message, in addition to the document placed in the medical records. Specialty, acceptance rates, type of intervention and time to acceptance was recorded. Overall acceptance was counted if team followed the ASP recommendations within 48 hours.

Results. A total of 621 interventions were made over the 25-month period (PC n=334, DC n=287). We found that direct communications did not improve the overall acceptance rates (PC 66% vs. DC 65%, p=0.791), but significantly improved same day acceptance rates (PC 15% [49/334] vs. DC 33% [96/287], p< 0.001). This trend for higher same-day acceptance was also noted regardless of specialty. It increased from 15% to 45% (p< 0.001) for medicine & 15% to 25% (p=0.025) for surgery. Furthermore, overall acceptance for medical discipline was significantly higher in the DC phase (68% to 80%, p=0.024); no significant difference noted for the surgical disciplines. Same-day acceptance also improved when we compared the most common types of interventions (culture based de-escalation, discontinue antibiotic, narrow empirical coverage). In addition, DC helped narrow empiric antibiotic choices, with improvements in both same-day and overall acceptance of interventions (increased from 8% to 43%, p< 0.001 and 57% to 78%, p=0.12, respectively).

Conclusion. Direct communication with clinicians boosted same-day acceptance for ASP interventions. In addition, it increased overall acceptance for medical disciplines, and to narrow empiric antibiotic use. Future efforts will focus on in-person strategy with surgical teams for fruitful results.

Disclosures. All Authors: No reported disclosures

53. Optimizing Transitions of Care Antimicrobial Prescribing at a Community Teaching Hospital

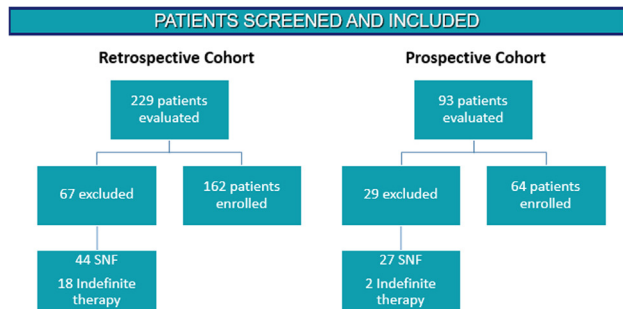
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Session: P-04. Antimicrobial Stewardship: Outcomes Assessment (clinical and economic)

Background. Antimicrobial stewardship integral to patient care. Institutions with stewardship decrease antibiotic use, cost, and antibiotic-associated infections. However, few efforts have been formally made to address discharge antimicrobial prescribing, even though many patients started on antibiotic therapy in the hospital are prescribed oral antibiotics to complete their regimens.

Methods. This was an IRB approved, quasi-experimental, pre-post study. Patients were included if they were >18 years and were discharged from the hospital with an oral antibiotic prescription. Patients discharged against medical advice, prescribed indefinite prophylactic antimicrobial therapy for legitimate reasons, or discharged to a skilled nursing facility were excluded. The retrospective group evaluated a random sample of patients discharged in 2/2020. The prospective group included patients discharged between 1/2021 - 6/2021. In the prospective group, a clinical pharmacist assessed the indication for antibiotics and pending discharge antibiotic prescriptions for physician review. Antibiotic choice and duration of therapy were based on local and national guidelines.

Patient Screening for Inclusion and Exclusion



Breakdown of patients screened, included, and excluded for study

Results. 86 (53.1%) of 162 retrospective patients from 2/2020 prior to implementation of the program demonstrated were discharged on inappropriate antimicrobial therapy with excessive duration being the principal driver for inappropriateness. In the prospective group of 64 patients, the rate of patients discharged on inappropriate antibiotics decreased to 28.1% (p=0.001). The duration of inappropriate therapy decreased from a mean of 4.6 days to 2.7 days (p=0.001). 45 (70.3%) of 64 prospective pharmacist interventions were accepted by providers.

Study Outcomes

OUTCOMES (* indicate statistical significance)			
Appropriateness of Therapy			
Outcome	Retrospective N = 162	Prospective N = 64	P-value
Appropriate Therapy*	76 (46.9%)	46 (71.9%)	0.001
Interventions Accepted		45 (70.3%)	--
Types of Inappropriate Therapy among Patients with Inappropriate Therapy			
Secondary Outcomes	Retrospective N = 86	Prospective N = 18	P-value
Inappropriate Duration	74 (86%)	17 (94.4%)	0.458
Days Inappropriate*	4.6 days	2.7 days	0.001
Spectrum	12 (14%)	3 (16.7%)	0.721
Frequency	11 (12.8)	1 (5.6%)	1
Dose	7 (8.1%)	1 (5.6%)	0.687

Outcomes including overall appropriate prescribing, appropriate duration, spectrum, frequency, and dose, as well as days of inappropriate therapy

Conclusion. Literature demonstrates that prospective evaluation of discharge antibiotics by a clinical pharmacist is effective in improving appropriateness of discharge antibiotic prescriptions, optimizing duration of outpatient antibiotics as well as reducing unnecessarily broad-spectrum therapy. The prospective results from this study demonstrate that this innovative approach can improve outpatient oral antibiotic prescribing and provide a framework for other institutions to implement similar programs.

Disclosures. All Authors: No reported disclosures

54. The Effect of Targeting High-Risk Patients for Antimicrobial Stewardship Intervention on Hospital-Onset Clostridioides Difficile Infection Rates

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Session: P-04. Antimicrobial Stewardship: Outcomes Assessment (clinical and economic)

Background. Clostridioides difficile infection contributes to significant burden on patients and the healthcare system, costing billions in excess costs every year for hospital care. Continued use of antibiotics after C. difficile infection diagnosis is a risk factor for recurrent infection. Also, individuals who have had a recurrence of C. difficile infection are at a higher risk of subsequent episodes.

Methods. This prospective, observational, pre-post study evaluated the effect of implementing a targeted antimicrobial stewardship initiative towards a high-risk target population on the rate of in-hospital C. difficile infection rates. High-risk targets were identified through an electronic health system report of admitted patients at a large academic medical center who were toxin assay positive or had a documented history of C. difficile infection. Subjects who met the criteria were assessed for interventions by the pharmacy-driven antimicrobial stewardship service. The primary outcome compared the hospital-onset C. difficile rates and standardized infection ratio (SIR) before and after implementation of the initiative. The SIR is reported to the National Healthcare Safety Network (NHSN) and is calculated as a ratio between the number of observed and predicted infections, which is adjusted for facility-specific factors that contribute C. difficile risk. Negative binomial regression was used to calculate the predicted C. difficile infections in the SIR. Poisson regression was used to generate a 95% prediction interval for the predicted C. difficile infection rate.

Results. The mean age of subjects was 63 years old and 85% had no history of prior *C. difficile* infection. The most common intervention was de-escalation of antibiotics (46%). The post-implementation SIR was 0.55 and hospital-onset *C. difficile* rate was 13, both of which were significantly lower than predicted.

Conclusion. Targeting patients who have a history of or are newly diagnosed with *C. difficile* infection may decrease hospital-onset *C. difficile* rates.

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55. Impact of Testing Methodology and Reporting on Time to Preferred Antibiotic Therapy in Extended Spectrum Beta-Lactamase producing Enterobacteriaceae (ESBL-E) Bloodstream Infections

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Session: P-04. Antimicrobial Stewardship: Outcomes Assessment (clinical and economic)

Background. Harborview Medical Center (HMC) identifies organisms and an ESBL genotype (CTX-M) via Verigene[®] Gram-Negative Blood Culture Nucleic Acid Test (BC-GN). University of Washington-Montlake (UWML) uses matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF MS) for organism identification directly from positive blood cultures and ceftriaxone results by Kirby Bauer disk diffusion (KB) are reported 18 hours later. No ESBL comment is reported at UWML. We aimed to determine whether the methodology in identification and reporting of ESBL-E from blood cultures between two hospitals has an impact on time to preferred therapy with a carbapenem antibiotic.

Methods. Retrospective observational study conducted at UWML and HMC in Seattle, WA between 1/10/2015 and 9/15/2020. Adult patients were eligible if they had ≥1 positive blood culture with an Enterobacteriaceae isolate resistant to ceftriaxone and were on antibiotic treatment. The primary outcome was the difference in time to preferred definitive therapy with a carbapenem antibiotic in patients an ESBL-E bloodstream infection (BSI) identified by Verigene[®] vs. MALDI-TOF MS/KB.

Results. A total of 199 patients were screened; 67 were included for UWML and 68 at HMC. The average time to initiation of a carbapenem antibiotic was 42 ±26.5 hours at UWML and 28 ±19.7 hours at HMC. A t-test detected a difference in time to preferred therapy between a Verigene[®] vs. MALDI-TOF MS/KB tested ESBL-E BSI [95% confidence interval (CI), 5.3-22.9]. The hazard ratio to carbapenem initiation for HMC is 1.73643 [95% CI, 1.1405-2.644].

Conclusion. A statistically significant difference in time to preferred definitive therapy among patients with an ESBL-E BSI processed by Verigene[®] was found compared to MALDI-TOF MS. The results suggest standardization in protocols between the UWML and HMC hospitals is warranted.

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56. High Frequencies of Adverse Drug Events with Intravenous vs Oral High-Dose Trimethoprim-Sulfamethoxazole: An Opportunity for Antibiotic Stewardship

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Trimethoprim-sulfamethoxazole: intravenous versus oral therapy

Session: P-04. Antimicrobial Stewardship: Outcomes Assessment (clinical and economic)

Background. Trimethoprim-sulfamethoxazole (TMP-SMX) is a high-bioavailability antibiotic associated with potentially serious adverse drug events (ADE). The objective of this study was to evaluate the safety of intravenous (IV) and oral (PO) high-dose TMP-SMX.

Methods. IRB-approved retrospective cohort of hospitalized patients from January 2016 to November 2020. Inclusion: ≥ 18 years old and > 72 hours of renally adjusted high-dose TMP-SMX defined as ≥ 5 mg/kg/day of TMP. Exclusion: prophylaxis. Endpoints during treatment: hyponatremia with sodium < 135 mmol/L, hyperkalemia with potassium > 5 mmol/L, serum creatinine increase of ≥ 0.3 mg/dL or 1.5-1.9 times from baseline, and fluid overload on physical exam. Descriptive and bivariate statistics were performed.

Results. Each group included 50 patients (Table 1). Intensive care unit patients comprised 82% IV TMP-SMX compared to 32% PO. Most common infection: respiratory tract 86% IV and 68.1% PO. Most common organisms were *Stenotrophomonas maltophilia* (52% IV and 18% PO) and *Pneumocystis jirovecii* (16.3% IV and 62% PO). Median (IQR) days of inpatient therapy: 6 (5-7.5) PO vs. 7.5 (6-11.3) IV. Median (IQR) days of total duration: 9 (6-21.5) PO vs. 12 (7.8-14) IV (p=0.93). IV group: 88% of patients received >1 liter of D5W daily. Median (IQR) liters of D5W daily was 1 (1-1.5). 56% had a diuretic added, and 38% had a diuretic dose increase. Majority of patients (78%) on IV were taking other oral medications. 100% patients experienced any adverse event with IV vs. 70% with PO (unAdjOR 2.43; 95% CI 1.89-3.13). Most common ADE in both groups: hyponatremia, hyperkalemia, and elevated creatinine. Hyponatremia: 92% with IV and 32% with PO (unAdjOR 24.44; 95% CI 7.50-79.68). Edema on physical exam, an ADE specific to IV TMP-SMX, was the third most

common side effect in the IV group. Relative changes from baseline in sodium, potassium, and creatinine from those who experienced hyponatremia, hyperkalemia and elevated creatinine were listed in Table 2.

Table 1. Baseline and Clinical Characteristics

Characteristics	Oral, n = 50	Intravenous, n = 50	p-value
Age, years- median (IQR)	62 (45-71)	60.0 (48-69.5)	0.63
Male sex- n (%)	31 (62)	29 (58)	0.68
Length of stay, days- median (IQR)	11 (8.5-20.5)	29.5 (15.5-44)	<0.05
Past Medical History, n (%)			
Congestive Heart Failure	5 (10)	8 (16)	0.37
End Stage Renal Disease	3 (6)	8 (16)	0.2
Acute Kidney Injury on Admission	13 (26)	18 (36)	0.28
Diabetes Mellitus, type 1 or 2	17 (34)	16 (32)	0.83
Active Oncologic Disorder	10 (20)	6 (12)	0.28
Immunocompromised	31 (62)	9 (18)	<0.05
Concomitant Medications Known to Increase Potassium- n (%)	19 (38)	4 (8)	<0.05
Type of Therapy at TMP-SMX Initiation- n (%)			
Empiric	23 (46)	16 (32)	-
Definitive	27 (54)	34 (68)	-

Table 2. Adverse Effects

Adverse Drug Event	Oral, n = 50	Intravenous, n = 50	p-value
Arr- n (%)	35 (70%)	50 (100%)	<0.05
Hyponatremia- n (%)	16 (32%)	46 (92%)	<0.05
Observed Sodium Decrease, mmol/L- median (IQR)	8.5 (3.0-14)	5.0 (4.0-7.5)	-
Hyperkalemia- n (%)	25 (50%)	19 (38%)	0.23
Observed Potassium Increase, mmol/L- median (IQR)	1.2 (0.7-1.7)	1.7 (1.3-2.2)	-
Elevated Creatinine- n (%)	21 (42%)	23 (46%)	0.69
Observed Creatinine Increase, mmol/L- median (IQR)	0.8 (0.5-1.2)	1.0 (0.4-1.6)	-
Neutropenia- n (%)	1 (2%)	4 (8%)	0.36
Thrombocytopenia- n (%)	3 (6%)	7 (14%)	0.32
Hypoglycemia- n (%)	10 (20%)	6 (12%)	0.28
Documented Skin Reaction- n (%)	0	3 (6%)	0.24
Edema on Physical Exam- n (%)	0	29 (58%)	<0.05
Pulmonary Edema on Imaging- n (%)	0	15 (30%)	<0.05

Conclusion. Patients on IV TMP-SMX therapy were more likely to experience an ADE compared to PO, likely driven by the high volume of free water. Most patients on IV TMP-SMX were on other PO medications, suggesting a missed stewardship opportunity for IV to PO conversion to reduce patient harm.

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57. Financial Impact of a Regional Antimicrobial Stewardship Cost Saving Initiative in a Large Integrated Healthcare System

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Session: P-04. Antimicrobial Stewardship: Outcomes Assessment (clinical and economic)

Background. A regional antibiotic stewardship program (ASP) within a large integrated healthcare system covering two, non-academic, tertiary care medical centers and an additional six community hospitals implemented multiple interventions to optimize antimicrobial therapy and reduce unnecessary hospital costs, such as transition to extended-infusion (EI) piperacillin/tazobactam (TZP), formulary restriction of antimicrobials, and antimicrobial stewardship clinical review. The purpose of this study was to evaluate the cost savings associated with these regional ASP initiatives.

Methods. This was a multicenter, retrospective, observational review of regional stewardship interventions across eight inpatient medical centers in Oregon. Data was collected from January 2019 to December of 2020. Cost savings associated with reduced TZP administrations was based on the duration of therapy for each encounter in adults who received TZP for >24 hours in 2020. The regional antimicrobial restriction policy was implemented in February 2020. Cost savings attributed to antimicrobial formulary restrictions and reduction in overall days of therapy/1000 patient days (DOT) were based on EPIC costs.

Results. The reduction in number of administrations with implementation of EI TZP resulted in \$226,420 saved in 2020. \$182,837 was saved due to decreased usage of restricted antimicrobial agents. An additional \$433,341 was saved for overall antimicrobial costs due to 19,775 days reduction in overall DOT/1000 patient days.

Conclusion. A community-based regional ASP has resulted in substantial financial impact and identified areas for future cost savings within the region.

Disclosures. All Authors: No reported disclosures

58. Impact of Order-set Modifications and Provider Education on Broad-Spectrum Antibiotic Use in Patients Admitted with Community Acquired Pneumonia

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